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ON A RESIDENT POPULATION OF THE GANGES RIVER DOLPHIN *PLATANISTA GANGETICA* IN THE KULSI RIVER (ASSAM) A TRIBUTARY OF BRAHMAPUTRA[1]

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(*With two text-figures*)

Key words: Ganges river dolphin, Kulsi river, ecology, habitat, population, conservation

A land-locked population of the Ganges river Dolphin, *Platanista gangetica,* was observed in the Kulsi river, a southern tributary of Brahmaputra. Its number has come down from 24 animals in 1992 to 12 in 1995. Large scale sand extraction and operation of fishing gear hazardous to the dolphins are the main causes for the decline in the population. The habitat of the dolphin, the hydrology of river, sand extraction and the fisheries were also studied. Conservation measures are suggested.

Introduction

The Ganges river dolphin *Platanista gangetica* is found in the river Ganges, Brahmaputra and Meghna and their tributaries (Anderson, 1879; Mohan, 1989 a, 1989 b, 1992; Mohan *et al.* 1993). Recently, while studying the river dolphins of Brahmaputra, a residential population of dolphins was observed in the river Kulsi, one of the southern tributaries originating from the hills of Meghalaya. The Kulsi river is about 80 km in length and it meanders through the Kamrup dist. of Assam. It crosses the National Highway NH 37 near the village Kukumara about 35 km west of Guwahati. (Fig. 1 & 2).

Ganges river dolphins are found throughout the year in the mainstream of Brahmaputra, migrating to the tributaries for feeding during the rainy season. (Reeves *et al.* 1993; Mohan *et al.* 1993; Reeves and Leatherwood, 1994). The land-locked population of river dolphins consisting of adults, adolescents and calves was found in a stretch of about 1 km of the Kulsi river throughout the year. Forty years ago, such a land-locked population was found in Kakdanga, another tributary (Pilleri, 1970). The river is now highly silted and no dolphins are found.

Observations on the Ganges river dolphin of Kulsi river were carried out from 1992 to 1995 to assess the status of its population, to study the ecological degradation of its habitat and to suggest conservation measures.

Methods

Though the dolphin habitat in Kulsi river was visited periodically, atleast biannually from March 1992 to November 1993, regular monthly observations were carried out from March 1994 to April 1995. Water temperature, turbidity, velocity of water current, sand extraction, fishing

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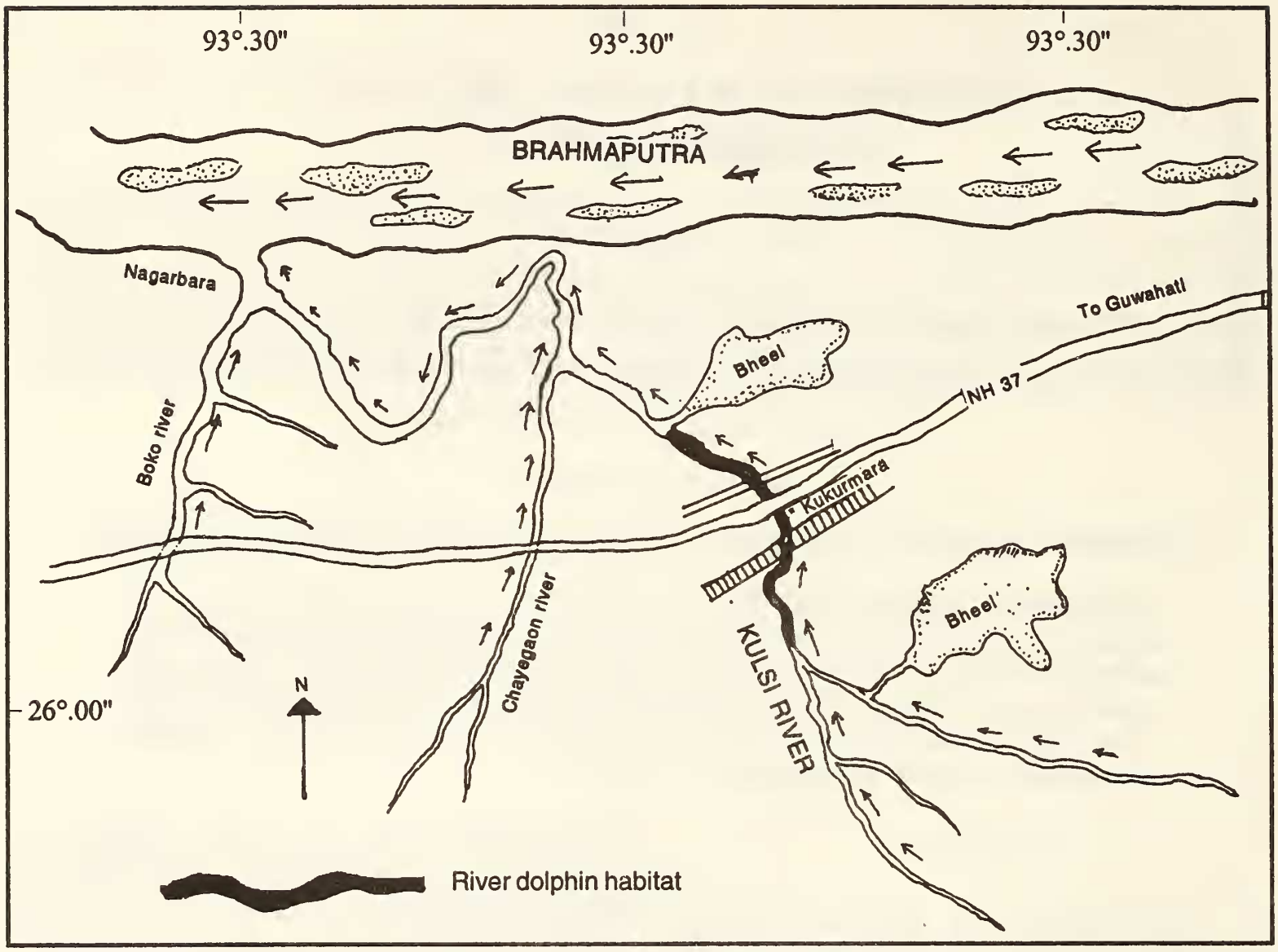

Fig. 1. Brahmaputra river showing the Kulsi river

activities and the species composition of fishes which have a bearing on the ecology of the river dolphins were studied. Two canoes with 2-3 fishermen and 2 or 3 scientific and field staff constituted the investigating team.

The dolphins were counted directly with or without binoculars (6x30) from the canoes. A Canon camera with 70-300 mm zoom lens was also used. The dolphins were counted when they surfaced, taking care to avoid repetition or missing them. For this purpose, body length, distance between the surfacing dolphins, length of the beak (adult females have longer beak) and intervals between surfacing were given due consideration. For example, if 3 dolphins surfaced at the same time they are counted as three; if 5 surface at the same time, they are counted as five. If two dolphins surface at one spot and another 3 at a distance of about 30 m within a second, the number can be assumed as 5. If an adult and a calf surface at different times, they are counted as 2. Usually the monitoring team stayed for more than 30 minutes at the surfacing area to count the population. A video camera was also used and the film was utilised to finalise the dolphin count.

Turbidity was measured using a Sechi disc. Water temperature was recorded with a mercury thermometer. The velocity of water current was measured by allowing a cork coated with white paint to drift for 30 seconds and recording the distance to compute distance travelled by the cork for one hour. Three such readings were taken and the average was estimated.

The number of canoes engaged in sand extraction was counted and the quantity of sand extracted by each boat was recorded to estimate

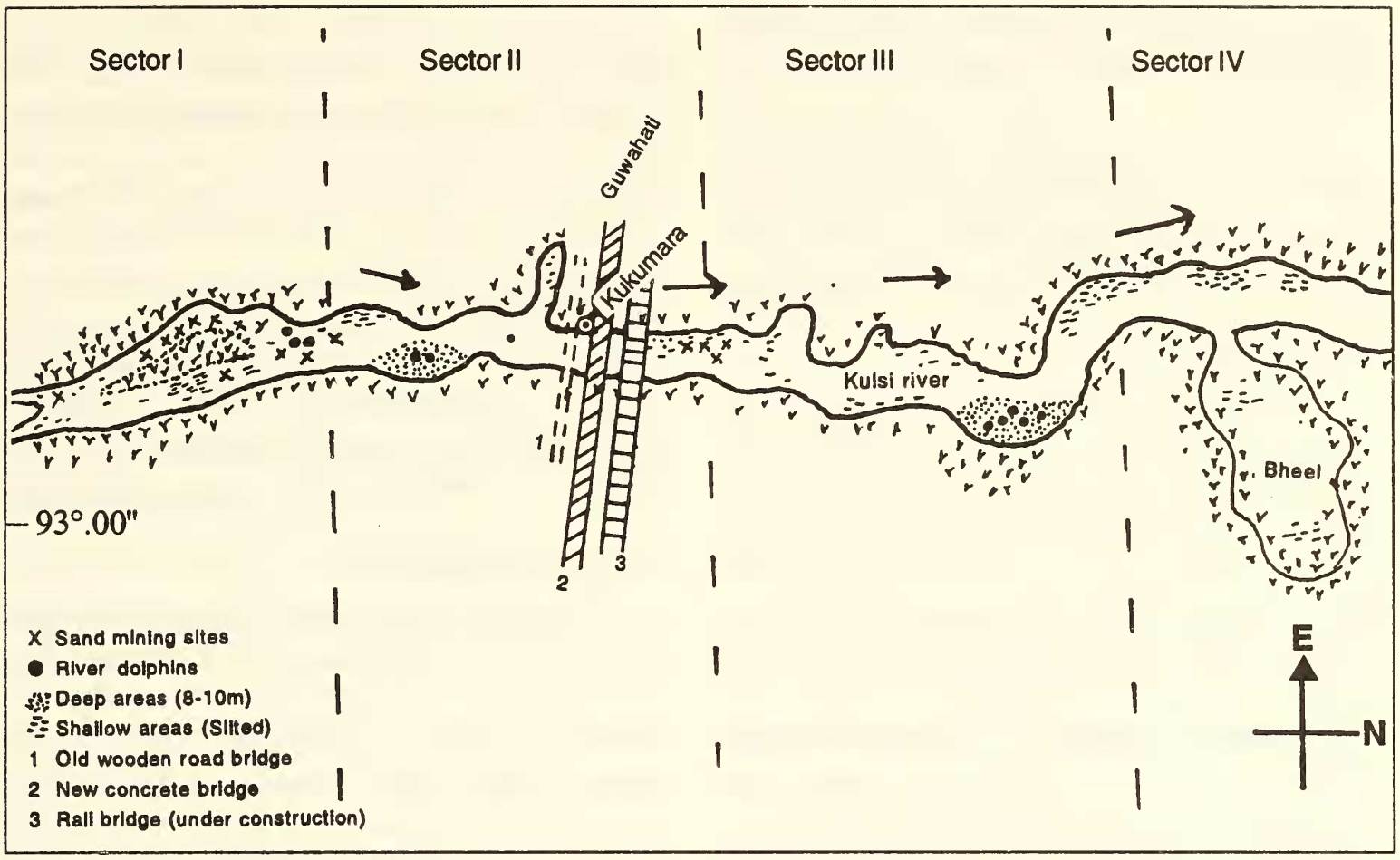

Fig. 2. Kulsi river showing the habitat of Ganges river dolphin

total sand extraction per day. The data was verified with the number of lorry loads of sand taken by contractors. Fish landing was estimated by examining the fishes caught by each fishing unit on the day of observation. Fish and prawn samples were collected by the senior author, preserved in 5% formalin and identified to the species level. The numbers of fishing tackle such as hook and line, traps and other devices were also recorded.

Results

1. **Dolphin habitat in the Kulsi river**:

River dolphins were found in 1 km of the river near Kukumara village. Width of the river dolphin habitat ranged from 10-30 m. The depth varied from 1.5 to 10 m during the rainy season from July to August, and 0.3 to 8 m during the dry season. The river was divided into 4 sectors each measuring about 250 m for recording the depth and other landmarks (Fig 2).

Sector I was very shallow with a depth of about 80-100 cm during the wet months from July to August. The upstream of the sector was also very shallow with 30-40 cm of water during September to May. A narrow stream with a strong current of about 33m/minute circumventing an island of about 200m^2 was found in the sector. Dolphins could be found at the confluence of this stream with the mainstream of the Kulsi river. During the dry months an island of 100m^2 was found at the confluence. Large scale sand extraction was carried out in the canal.

Sector II had a trench of about 500m^2 width and depth of about 8m, even during the dry months. The deep area was a good dolphin habitat. The sector was highly turbid and the sand was dumped along the banks here. The banks of the sector was made of hard laterite in the deep areas. An old, dilapidated, unused wooden bridge, a concrete road bridge (NH 37) and a rail bridge were in this sector.

In Sector III the river took a U turn, with

an area of 1000m² and a depth of 8-10 m. Many dolphins were found here along with calves and forage fishes.

Sector IV was shallow with a depth of about 40 cm in dry months and about 1.50 m in the rainy season. Large areas in the sector and further downstream were exposed during the dry months from October to May.

2. **Hydrology**:

Hydrological conditions such as water temperature, turbidity and the velocity of the current are closely related to the ecology of the dolphins. As the Ganges river dolphin is a fluvial species, water current is important for its long term survival. It has been reported in greater numbers at the confluence of rivers with strong currents (Pilleri, 1970, Mohan *et al.* 1993).

The water temperature varied from 10°C in December to 25°C in April. Water temperature was low as the river drained from the hills of Meghalaya. The turbidity was highest in August during the rainy season. In the upstream of Sector I during March 1995, the Sechi disc reading was 19 cm, while it was only 11-13 cm in the downstream of the sector where intense sand extraction was being carried out. The Sechi disc reading was 17 cm for the summer period in the sector. Further down in Sector III, the reading was 16 cm and in Sector IV where there was no sand extraction, it was 18 cm.

The velocity of the water current was highest during the monsoon. In the canal of Sector I the water current was 2.0 km/hr in March 1995, and 1.8 km/hr in the mainstream. For the same period in Sector II it was 1.1 km/hr, in Sector III 1.0 km/hr and 0.7 km/hr in Sector IV where the river is highly silted.

3. **Sand extraction**:

Sand extraction was the major cause of habitat degradation. Large quantities of sand were extracted from the dolphin habitat, mostly from the canal area of Sector I, at the confluence of the canal, and in the area down the bridge (Fig. 2). Good quality sand was available only at a few places along the river. About 100 canoes operated, from a stretch of about 1.50 km, each making 3-4 trips daily. The Assam Government leases out the right of sand extraction to the contractors. Annually about 12,500 MT of sand is taken from the river. The sand extraction has caused silting of the dolphin habitat, smothering of bottom fauna, and lowering of the productivity of the river by blocking the sun-light and preventing photosynthesis. These ecological degradations have a serious impact on the fish production on which dolphins depend for food.

4. **Dolphin population**:

Sector I was a good habitat for the dolphins. The dolphins were invariably found at the confluence of the canal joining the mainstream. Four dolphins were seen in this sector. They were found foraging here, unconcerned with the intense sand removal and fishing activities. The dolphins retreated to deeper areas of Sector II after foraging in the adjacent areas. Though Sector II was highly silted, one or two dolphins were noticed. Calves and adults were observed in the deep trench.

The main dolphin habitat was the deep trench in Sector III. The trench was about 8 m deep with an area of 1000 m². Five dolphins comprising of adults, adolescents and calves were seen. The adult female dolphin was characterised by a long curved beak and pale brown colour. The adolescent dolphins were paler in colour. The calves were usually dark brown. Dolphins more than 1.5 m in body length were considered adults, 1.0-1.5 m adolescents and less than 1 m as calves. There were differences in the behaviour between adults and calves. Calves were often seen leaping over the surface of the water while the adults and adolescents surfaced exposing their beak and the melon. Occasionally, the adolescent dolphins exposed two-thirds of their body. On one occasion an adolescent dolphin stood vertically, exposing its beak and head above the surface of the water. The dolphins surfaced at intervals of 20 seconds to 3 minutes. The calves surfaced more frequently

than the adults at intervals of 15 to 30 seconds. When the adults surfaced, the 'blowing' sound was very audible, with a spurt of water from the nostrils. When an adult dolphin surfaced near the canoe we could smell its breath which was very similar to that of cows.

Between the years 1992 and 1995, there has been a gradual decline in the dolphin population in the habitat. In 1992 we observed 24 dolphins. This number came down to 17 in 1993, 14 in 1994 and 12 in 1995 (Table 1). The decrease in population was 29% in 1992-1993, 17.6% in 1993-94, 14.3% from 1994-95. The reduction is very high in spite of the recruitment as indicated by the presence of calves. The people in the area do not harm dolphins, but accidental entanglement in gill nets cannot be ruled out. One male dolphin, 1.75 m in length, was found on the banks of the river on 15.10.94 near the village Kukumara, with gill net marking near the melon. In 1992 and 1993, as many as 12

TABLE 1
DOLPHIN POPULATION IN THE RIVER KULSI

	1992	1993	1994	1995
Calves	5	3	3	2
Adolescents	8	8	7	6
Adults	11	6	4	4
	24	17	14	12

dolphins were seen in Sectors I and II, but in 1995 we observed only 7 dolphins in these sectors.

6. **Fishes and fishery of Kulsi dolphin habitat**:

Fishes and fishery of Brahmaputra and its drainage were studied by Motwani *et al.* (1962), Yadav and Sugunan (1992), Yadav and Chandra (1994) and Biswas *et al.* (1995). About 225 species are reported so far from Brahmaputra (Yadav and Sugunan, *Ibid*). During our studies, 49 species of fishes, 4 species of prawns and two species of turtles (*Trionyx hurum* and *T. gangeticus*) were recorded from the Kulsi river. This included the food species of the river dolphin *Chela laubuca, Puntius sophore, P. ticto, Colisa fasciata, Glassogobius giuris, Mastacembalus pancalus, Wallago attu, Ompak* sp, *Bagarius bagarius,* and the prawn *Macrobrachium choprai.*

The traditional fishing gear are cast nets (Fasi jal), current net (gill net), dip nets (Dheki jal), drag nets, stalk net (Ban Jal) and moving cast net (othal jal). About 300-800 kg fishes were caught from the river monthly. *Mastacembalus pancalus, Puntius* spp. *Mytus vittatus, Chela laubuca* and *Macrobrachium choprai* form the main fishery.

DISCUSSION

The river dolphins of Kulsi are the only river dolphin population in the area accessible to observers. Furthermore, the population has survived in spite of degradation of its habitat due to human activities, though in decreased numbers.

Pilleri (1970) observed that in November, 1959 a resident population of river dolphins at the confluence of the rivers Kakdanga and Bhogdoi near Neghereting in Jorhat dist. Assam. But when we visited the river in November 1993, it was highly silted and the dolphin population had become extinct. It is possible that the same fate might fall on the dolphins of Kulsi river if the ecological degradation such as sand extraction is continued. Gill nets are hazardous to the dolphins as many thousand marine dolphins have reportedly been killed in them (United Nations, 1990). Hence operation of gillnets is detrimental to the river dolphins.

Perrin *et al* (1994) observed that a mortality rate of 4% and 5% is not sustainable in *Sousa chinensis* with a population of 2000 in the Indian Ocean coast of South Africa and in *Stenella coeruleoalba* with a population of 1,00,000 in eastern north Atlantic respectively. The reproductive biology of these coastal cetaceans is more or less the same as the Ganges river dolphin. Hence, the annual reduction in the Ganges river dolphin population, which ranged from 14-29% during 1992-1995, cannot be sustainable.

These dolphins are at a higher trophic level and feed mainly on fishes and prawns. Many species of fishes have been reported from the stomach contents of the river dolphin. (Shrestha, 1989, Sinha *et al.* 1993). Many of the food species were found in the Kulsi river also. Any degradation of the ecology of the river will have serious impact on the fishery potential of the river, affecting its capacity to sustain the dolphin population.

Any efforts for the restoration of the river should be directed towards banning or regulating sand extraction, banning the operation of gil lnets and creating awareness among the fishermen. Declaration of the river dolphin habitat as a river dolphin sanctuary under the Indian Wildlife (Protection) Act 1972 will go a long way to protect this population. Planned eco-tourism of 'dolphin sighting tours' will help create awareness. 'The River Dolphin Protection Committees' under the Conservation of Nature Trust, Calicut, has initiated many action plans at the grassroots level to protect the species. The Government of Assam and the Ministry of Environment and Forest, Government of India, New Delhi, have been alerted about the impending danger to this population.

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